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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,467	08/22/2003	Kenneth S. Collins	006915/P6	8489

7590 02/26/2007  
Patent Counsel, M/S 2061  
Legal Affairs Dept.  
Applied Materials, Inc.  
P.O. Box 450-A  
Santa Clara, CA 95035

EXAMINER
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GHYKA, ALEXANDER G

ART UNIT	PAPER NUMBER
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2812

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/646,467

Applicant(s)

COLLINS ET AL.

Examiner

Alexander G. Ghyska

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-85 is/are pending in the application.
- 4a) Of the above claim(s) 12-14, 18-29, 31, 36, 45-47, 70-72, 81 and 82 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-17, 30, 32-35, 37-44, 48-69, 73-80 and 83-85 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

ALEXANDER GHYKA  
PRIMARY EXAMINER

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Claims 12-14, 18-29, 31, 36, 45-47, 70-72 and 81-82 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/07/2006.

Claims 1-11, 15-17, 30, 32-35, 37-44, 48-69, 73-80 and 83-85 are now under consideration.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-5, 44, 48-59 and 73-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henley et al (US 6,321,134) in view of Ishii et al (US 5,571,366).**

The present Claims generally require a method for implanting ions in a layer of a workpiece comprising: placing said workpiece on a workpiece support in a chamber with said layer being in facing relationship with a ceiling of said chamber, thereby defining a processing zone between said workpiece and said ceiling; introducing into said chamber a process gas comprising the species to be implanted in said layer of said workpiece; generating from said process gas a plasma by inductively coupling RF source power into said processing zone from an RF source power generator through an inductively coupled RF power applicator; applying an RF bias from an RF bias generator to said workpiece support.

With respect to Claim 1, Henley et al disclose a system for processing a workpiece which comprises a plasma immersion ion implantation reactor (Figure 4), which comprises an enclosure comprising a side wall and a ceiling defining a chamber 414; a workpiece support pedestal 465 within the chamber having a workpiece support pedestal 465 within the chamber having a workpiece support surface facing said ceiling and defining a process region extending generally across said wafer support pedestal; an inductively coupled source power applicator 440; and an RF plasma source power generator 466 coupled to said inductively coupled source power applicator for inductively coupling RF source power into said process zone. Henley et al further

disclose a plasma clean chamber 24 and an additional chamber for thermal treatment.

See column 6, lines 15-30.

Henley et al does not teach an RF bias generator having an RF bias frequency of the claimed values.

Ishii et al teaches an inductively coupled plasma apparatus (Figure 1), comprising a gas distribution apparatus 20 and an RF bias generator 19 having an RF bias frequency of about 2 MHz coupled to a workpiece support pedestal 4. See column 5, line 56 to column 6, line 16.

It would have been obvious for one of ordinary skill in the art, at the time of the invention, to modify the plasma immersion reactor taught by Henley et al to include an RF bias generator with a frequency of about 2 MHz , to effectively emit the flow of the plasma onto the target surface of the workpiece

With respect to the RF bias frequency as required by Claims 2-5 and 55-58, the range as disclosed by Ishii et al would meet the limitations as required by the aforementioned Claims, as the present Specification disclose a bias frequency between 10 kHz and 10 MHz. Moreover, the setting of the proper reaction parameters would simply be a matter of optimization. See *In re Antonie* 195 USPQ 6 (CCPA 1977).

With respect to Claim 44, Henley disclose RF power. See column 6, lines 40-50.

With respect to Claims 48-54, Henley et al disclose providing a single pulse of energy. See column 18, lines 34-40.

With respect to Claims 73-80, Henley et al disclose that the processing system can comprise an ion beam implantation apparatus. See column 14, lines 25-26.

**Claims 6-11, 15-17, 30, 32-35, 37-43, 60-69 and 83-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henley et al (US 6,321,134) in view of Ishii et al (US 5,571,366) as applied to claims 1-5, 44, 48-59 and 73-80 above, and further in view of Wu et al (US 4,584,026).**

Henley et al and Ishii et al are relied upon as discussed above.

However, Henley et al and Ishii et al do not disclose the different dopants, pre-implant ion bombardment and masking as required by the Claims at hand.

Wu et al teaches it is well known in the art to perform methods of amorphizing the surface of a silicon substrate by pre-implant ion bombardment. See column 3, lines 29-52. Moreover, Wu et al disclose dopants as required by the Claims at hand and disclose the use of masks. See column 3, lines 25-50.

It would have been obvious for one of ordinary skill in the art to use the dopants, masks and pre ion bombardment as disclosed by Wu et al, in the process of Henley et al and Ishii, for their relative benefits in plasma implantation processes. As all of the references pertain to plasma ion implantation of semiconductor surfaces, a *prima facie*, case of obviousness is established.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Friday during general business hours.

Art Unit: 2812

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AGG

February 14, 2007

ALEXANDER GHYKA  
PRIMARY EXAMINER

AU 2812  
